

Biophysical Characteristics of Tropical Peatland

by

Lulie Melling¹, Goh Kah Joo², Lah Jau Uyo¹, Alex Sayok³ and Ryusuke Hatano⁴

¹*Department of Agriculture, Jalan Badruddin, 93400, Kuching, Sarawak, Malaysia*

²*Advanced Agriecological Research Sdn Bhd., 47000, Sg. Buloh, Selangor, Malaysia*

³*Peat Swamp Forest Project UNDP/GEF Funded, FRIM, 52109 Selangor, Malaysia*

⁴*Graduate School of Agriculture, Hokkaido University, Sapporo, 060-8589 Japan,*

Introduction

Based on Jenny's equation (1941) of soil forming factors i.e. $S = f(C, R, B, P, T)$ with the five soil forming factors, the biotic (B) factor of soil formation is the most multifaceted among them. The biotic factor can be grouped into vegetation, micro-organisms, animals and human activities. Vegetation is considered to be the most important facet of the biotic factor. Efforts to explain soil characteristics in terms of the influence of biota are best facilitated by **biosequence** studies. These studies contain a series of soil profiles across which the biotic soil forming factor varies while other soil forming factors remain constant. Within the context of a biosequence, the effect of changing biotic factor upon any soil property can be assessed quantitatively. For tropical peat, vegetation is both a biotic and parent material for soil forming factors.

The elemental composition of soil differs from that of geologic materials in its striking enrichment of carbon and nitrogen compounds relative to most rocks. The organic compounds of the plants are the ultimate sources of this C and N. Plants contribute organic compounds to the soil in a variety of ways, including the senescence or necrosis of tissue, exudation or respiration from the roots, and the liberation of reproductive tissues such as pollen, seeds and fruits. Thus plants that live on the soil both influence soil properties and are influenced by soil properties. And these have been observed on the tropical peat of Sarawak whereby there is an existence of biosequence in each peat basin i.e. different forest types on a peat basin means different soil characteristics caused by different biophysical characteristics of the peat. This biosequence in the peat swamps of Peninsular Malaysia is less highly developed than those in Sarawak (Anderson, 1964). Therefore the objective of this paper is to describe the physical characteristics of the peat in relation to the forest types and its implication to agriculture development especially oil palm cultivation on tropical peat.

STUDY AREA AND METHODS

(a) Study sites

The study sites were Dalat and Mukah Sago Plantation (Melling, 2000); Maludam National Park (Melling and Hatano; 2004); Loagan Bunut National Park (Melling et al., 2006) and Rinwood Oil Palm Plantation Sites (2006-2007) in Sarawak, Malaysia. The size of each study site is shown in **Table 1**.